## CLAIMS

What is claimed is:

1. A method of making a composite floor tile comprised of a substantially flat, polymeric substrate having respective top and bottom surfaces and a preformed polymeric lamina having a bottom surface thereof laminated to the top surface of the substrate, comprising the steps of:
providing a two-platen injection molding machine with respective first and second aligned mold halves, the first half being fixedly mounted and the second half being movable toward and away from the first half;
forming an open-ended cavity in the first mold half with a predetermined substrate design shape;
forming a second open-ended cavity in the second mold half with sidewalls for seating the preformed lamina therein;
seating the preformed laminate in the second cavity with the bottom surface thereof facing the open end of the second cavity;
driving the second mold half against the first mold half for a predetermined period of time to form a mold cavity for molding the tile therewithin;
injecting molten polymeric material into the cavity and against the one surface of the preformed lamina under a pressure sufficient to fill the first cavity and at a temperature sufficient to thermally bond the molten substrate material to the bottom lamina surface in the second cavity; and
cooling the enclosed mold cavity to solidify the injected substrate material, whereby the substrate is molded and the lamina laminated thereto within substantially the same period of time.

2. The method as claimed in claim 1 and further comprising:

selecting a polymeric preformed lamina with a thickness of between 4 x $10^{-3}$ and 150 x $10^{-3}$ inch.

3. The method as claimed in claim 1, wherein said polymeric material is injected into the enclosed molding cavity at a temperature of between 140 °C and 300 °C.

4. The method as claimed in claim 3, wherein the substrate plastic is injected into the first mold cavity half at a pressure of about 1,300 pounds per square inch, and wherein the mold cavity is closed with approximately 200 metric tons of force applied to the said second mold half.

5. The method as claimed in claim 4, wherein said predetermined time of mold closure ranges between 10 and 120 seconds.

6. The method as claimed in claim 1, and further comprising the step of applying vacuum pressure to the lamina in the second cavity to retain the lamina therein by suction.

7. The method as claimed in claim 6, wherein said lamina weighs about 0.10 pound per square inch, and wherein the vacuum pressure ranges between 3 and 5 pounds per square inch below atmospheric pressure for that weight of lamina.

8. The method as claimed in claim 7, wherein the vacuum pressure is applied to the corners and center portions of the top surface of the lamina from the bottom of the second cavity.

9. The method as claimed in claim 1, wherein the lamina has a decorative top surface, and wherein the step of seating the lamina includes

placing the top surface thereof against the bottom of said second cavity, and selectively applying a suction pressure thereto.

10. An injection molding apparatus for making a modular interlocking composite plastic tile of a substrate with preformed planar plastic lamina laminated thereto, comprising:
first and second co-actable mold platens having substantially planar faces mounted in substantially parallel and opposed relationship,
means for fixedly mounting the first platen,
drive means for driving the second platen toward and away from said first fixed platen,
first and second open-ended mold cavities recessed in the faces of said first and second platens respectively for molding bottom and top portions of the tile substrate, respectively,

said cavities having open ends aligned substantially opposite one another for forming an enclosed mold when the face of said second platen is driven into abutting relationship with the face of said first platen by the said drive means,

each of said cavities having a substantially planar base substantially parallel to and inwardly of the planes of a corresponding one of the platen faces and first, second, third, and fourth substantially rectangular sidewalls adjoining corresponding first and second one of the cavity bases and extending substantially perpendicularly therefrom toward the plane of a corresponding platen,
said first and second sidewalls disposed at substantially right angles with respect to each other and intersecting to form a first interior corner region in each of their respective cavities, and said third and fourth sidewalls disposed at substantially right angles with respect to each

other and intersecting to form a second transversely opposite interior corner region in each of their respective cavities,

a pair of first elongated interlock element molding strips each formed in the platen face of said first platen adjacent the first and second sidewalls, respectively, of said first platen, and positioned opposite said second cavity laterally inwardly of the first and second sidewalls thereof, respectively, for molding a first pair of substantially right-angled substrate edges and contiguous portions of the substrate in the first corner region of the first cavity,

a pair of second elongated interlock element molding strips each formed in the platen face of said second platen laterally outwardly of said third and fourth sidewalls respectively, of said second platen and projecting towards the plane of said first platen face for molding therebetween a second pair of substantially right-angled substrate edges and contiguous portions of the substrate laterally outwardly of said second corner region of said second cavity,

the first and second pairs of molding element strips having respective substantially identical, inverted patterns of edge interlock elements thereon,

the corner regions of said second cavity being spaced to receive and position plastic lamina in said second cavity in an orientation substantially parallel to the plane of said second mold platen, and

conduit means coupled to said first platen and communicating with said first cavity for feeding molten substrate plastic for the tile substrate into said closed mold, whereby the substrate is molded and the lamina adhered thereto during substrate molding.

11. The apparatus as claimed in claim 10, wherein said second cavity is recessed to a depth dimension at least equal to the thickness of the lamina, and wherein the lamina lies upon the cavity base thereof,

whereby the substrate plastic flows partially into said second cavity and into contact with the lamina.

12. The apparatus as claimed in claim 11, wherein said first corner region of said first cavity are joined by said first and second sidewalls of substantially equal length and width, whereby the substrate surface area underlying the lamina is substantially square and includes underlying interlocks molded into the substrate by said first pair of interlock strips on said first platen.

13. The apparatus as claimed in claim 12, wherein said second pair of interlock strips on said second platen extend laterally outwardly of said second cavity, whereby said second pair of interlock molding elements mold the second pattern of interlocks laterally outwardly of their corresponding lamina edge.

14. The apparatus as claimed in claims 12, wherein said first pair of interlock strips on said first platen include a sequence of male-female interlock elements positioned laterally inwardly of said first and second sidewalls of said second cavity, whereby said first pair of interlock strips mold the first pattern of interlock elements beneath their corresponding lamina edges.

15. The apparatus as claimed in claim 11, and further comprising, second conduit means communicating with said second cavity base, and means for applying a vacuum to said second conduit means, whereby the lamina is retained in the second cavity by suction.

16. The apparatus as claimed in claim 14, wherein said first and second pairs of interlock strips on each of said platens are spaced from one another adjacent their corresponding corner regions.

17. The apparatus as claimed in claim 16 wherein a first plurality of male interlock molding elements project from said mold interlock strips of said first pair toward said second pair, and wherein a second plurality of male interlock elements of said second pair project toward said first platen.

18. The apparatus as claimed in claim 14 and further comprising:

means for releasing the vacuum whereby said first cavity retains the substrate with the preformed lamina bonded thereto, and further comprising, means for operating said drive means to open said mold halves for removing the floor tile from said first cavity.

19. The apparatus as claimed in claim 10, and further comprising: robotic means including a movable arm operative while the platens are open for withdrawing a molded composite tile from said first cavity and for placing the next lamina in said second cavity.

20. The apparatus as claimed in claim 19, wherein the robotic arm comprises first and second substantially parallel, transversely spaced-apart suction pads for conveying the composite tile and the lamina respectively.

21. The apparatus as claimed in claim 20, wherein said pads are coupled to a source of vacuum pressure, and

valve means coupled to said source for selectively applying vacuum to said pads.

22. The apparatus as claimed in claim 21, wherein said robotic arm is movable in both parallel and perpendicular directions relative to the movement direction of said second platen.